THERE'S LIFE IN THAT DEAD WOOD
SO LEAVE SOME IN YOUR WOODLAND

Dead wood is widely recognized as important for wildlife, and woodland managers are frequently told they should leave more – but how much more? **Jill Butler**, **Fred Currie** and **Keith Kirby** put forward a series of benchmarks for discussion based on the importance of the site for nature conservation and the owners' objectives.

The habitats that dead and decaying wood provides, whether on the ground and in living old trees, are important for maintaining biodiversity within woodland. There is, however, little information on the amount of dead wood or decaying wood habitats in British woodland (Kirby et al., 1998) or guidance as to how much should be left in woods managed for wood production (Hodge and Peterken, 1998). The UK Forestry Standard makes no quantitative recommendations; the figures in the UKWAS Criteria and Targets (3 standing and 3 fallen stems per ha) are seen by many specialists as very much a minimum figure, with 5-10 trees a more desirable level.

Over the last eighteen months the authors have tried to devise a system that could help owners and managers build up the levels of this important habitat in their woods. It is intended as a basis for discussion, not as the blueprint which regulators should follow blindly on all sites. Related guidance is being produced for Forest Enterprise woodland (Forest Enterprise, 2002).

Setting some benchmarks

In Table 1 we suggest some benchmarks for maintaining the dead wood resource in sites of different types, especially in ancient semi-natural woodland and woods in Sites of Special Scientific Interest. Parts of them may also be applied, with some modifications, to plantations on ancient woodland sites that are being restored to native broadleaves where retention of large broadleaf logs is particularly valuable, and to some forms of wood-pasture, although many of the latter require a different approach.

Decaying wood habitats are not restricted to woodland, but occur in hedgerow and parkland trees, pollards along rivers and in urban areas. These trees in the wider countryside may often be critical for the survival and dispersal of many species associated with decaying wood habitats, including some that are a priority under the UK Biodiversity Action Plan. Therefore a modified set of guidance will also be needed for the non-woodland managers.

Benchmark 1 is what we feel should become the minimum aimed for in all ancient semi-natural woodland, even where wood production is a key objective for the owner. The highest level (4 in Table 1) is what we would expect to move towards in the most important sites for the species associated with dead and decaying wood, even where an owner might have been seeking a return from timber. However such sites will be a minority and are in most instances already nature reserves or under equivalent management. The intermediate benchmark levels would be

Table 1. Benchmarks for different types of wood with different ages/ structures.

In order to maintain dead wood at levels appropriate to different levels of wildlife value the following management is suggested.

Benchmark level	1 - minimum	2 - moderate
Age of stand <50 years	Adopt UKWAS minimum standard of 3 standing and 3 fallen stems per ha on average.	Retain all decaying wood where possible.
50 - 120 years	5% of standing stems per ha to be dead or contain significant decaying wood features. 5% of stems per ha to be retained for perpetuity and canopies freed to allow full crown development. 5% of cut wood left on site. All fallen decaying wood retained.	10 % of standing stems per ha to be dead or to contain significant decaying wood features. 10% of native stems per ha to be retained for perpetuity and canopies freed to allow full crown development. Vary thinning intensity to improve crop while maintaining a sustainable supply of decaying wood habitat and veteran trees. 10% of cut wood left on site. All fallen decaying wood retained.
> 120 years	5% of standing stems per ha to be dead or contain significant decaying wood features. 5% of mature stems to be retained for perpetuity. 5% of cut wood left on site. All fallen decaying wood retained.	10% of standing stems per ha to be dead or to contain significant decaying wood features. 10% of native stems per ha to be retained for perpetuity and canopies freed to allow full crown development. 10% of cut wood to be left on site. All fallen decaying wood retained.

Notes on Table

1. In all stands the diameter of retained decaying wood stems should be 75% of the diameter of the largest tree.
2. Provision should be considered at a site and surrounding landscape scale [within 1km] to maximize benefits.
3. Where the current stand structure does not match the table the aim should be to achieve the benchmarks over a 20-year period.
4. Where dead standing and fallen trees cannot be retained without compromising public safety, only the minimum work should be undertaken to make it safe.

Throughout this table it is assumed that public safety will be considered in carrying out the actions indicated.

3 - high	4 - very high
All decaying wood to be retained. Variable thinning to improve stand structure but retain any existing decaying wood undamaged. Leave some cut wood on site.	All decaying wood to be retained. No general thinning but open up potential ancient trees and glades. Leave all cut wood on site.
20% of standing stems per ha to be dead or to contain significant decaying wood features. 20% of stems per ha to be retained for perpetuity and canopies freed to allow full crown development. Only thin where necessary to improve diversity of structure for conservation aims and to maintain sustainable variety of decaying wood habitat and ancient trees. 20% of cut wood left on site. All fallen decaying wood retained.	All trees with decaying wood characteristics to be retained. 20 veteran trees per ha with canopies kept open. Identify future generations of veteran trees and allow crowns to develop. All cut wood to be retained on site. All fallen decaying wood retained.
Retain all decaying wood habitats and 50% mature trees. Maintain existing veteran trees. Identify future veteran trees and allow crown development. 40% cut wood to be left on site. All fallen decaying wood retained.	Retain all decaying wood habitats. Maintain existing veteran trees. Identify future veteran trees and allow crown development. All cut wood to be left on site. All fallen decaying wood retained.

5. Within all stands some trees should be retained in perpetuity. These should be marked to avoid accidental removal and be plotted on management plan maps.
6. In mixed species stands there should be decaying wood habitat and trees retained for perpetuity of each species wherever possible in proportion to the percentage of the species in the stand.
7. In ancient woodland sites where conifer plantations are being converted back to native broadleaves there may be cases for retaining some dead and decaying conifers, along with any remnant broadleaved patches. Any bits of large broadleaf timber in particular should be left. The majority of the felled conifer is however likely to be removed from the site. Further work is needed on the benefits of leaving some coniferous dead wood, compared to possible risks to nearby productive conifer crops.

Table 2. Judging the existing or likely potential value for decaying wood habitats of a site. (Sites may not always score highly across the board.)

	Factor	Low
Known interest	*Known interest for groups associated with dead wood, eg. saproxylic species, hole-nesting birds, bats etc.*	No known interest (but this may be because there has not been any survey done).
Continuity and occurance of habitats on site	*Current levels of decaying wood habitats on site.*	Little fallen wood (less than 10m^3/ha), trees show few dead branches or decay.
	Continuity of decaying wood habitats (in most cases this will be difficult to judge).	Known that there has been little continuity of habitat, and current resource of recent origin.
	Veteran trees.	None and mature trees also scarce.
Site history and management	*History of site.*	Recent woodland.
	Management over last 60 years.	Most of site composed of stands less than 40 years old.
Landscape context	*Surrounding land use.*	Wood isolated, with few hedgerow trees or other woods within 3km.
	Woodland size.	Less than 2ha.

Medium	High	Very High
Small numbers of species known to be present, but mainly widespread ones.	Good numbers including some specialists.	High numbers of species, including range of specialist or BAP species.
Low to medium levels of fallen wood (11-20m^3/ha); some trees with dead branches/rot holes.	Medium to high levels of fallen wood (21-40 m^3/ha); dead trees present (2-3/ha); dead wood in crowns and rot holes common in living trees.	High levels of fallen dead wood of large sizes; dead trees or stumps common; large trees with good range of decaying wood habitats common.
History of current resource and continuity unknown.	Known that at least low levels of dead wood habitat present in past.	Known or suspected high continuity of deadwood habitat.
Veteran trees less than 1 per ha; or majority of trees mature.	Veteran trees more than 3 per ha and some mature trees also.	Veteran trees common and many of remaining trees mature.
Plantations on ancient woodland sites.	Ancient semi-natural woodland with no veteran trees.	Ancient wood-pasture/parkland; or ancient semi-natural woods with veteran trees.
At least 25% of wood managed as minimum intervention or managed to promote decaying wood habitats.	At least 50% of wood managed as minimum intervention over last 60 years or managed to promote decaying wood habitats.	At least 75% of wood managed as minimum intervention over last 60 years or actively managed to promote decaying wood habitats (not applicable to parkland).
Some woods or hedgerow trees present within surrounding 3km.	Ancient woodland common in landscape; some sites nearby of high value.	Landscape in which veteran trees or other sites of high value for decaying wood habitats are common.
2-5ha.	6-20 ha.	>20 ha.

Table 3. Combining site value and woodland objectives to determine benchmark level.

Existing or potential interest (from Table 2)	Benchmark level for different combinations. Use these scores to suggest where you should be on Table 1.		
Very high	4	4	4
High	4	4/3	4/3
Medium	3	3/2	2
Low	3	2	2/1
Priority in owner's objectives for nature conservation	High	Medium	Low

applied according to the known or likely interest of the site and the owner's objectives.

Two further tables are therefore key to our approach. Table 2 provides a way of judging how important a site is likely to be for dead wood and related habitats, based on a series of features, rated from Low to Very High. In Table 3 we use the assessment derived from Table 2 and the manager's objectives for the wood to set the level of 'Deadwood Benchmark' (on a 1-4 scale) that the manager should aim for in Table 1.

This approach deals mainly with the quantity of dead wood that is left. The 'quality' of the decaying wood habitat is also important in determining its value for nature conservation. The size of individual dead timbers, whether the dead wood is part of a living tree or fallen log, what situation it is left in, what species of tree it is, all affect which other species will occur in or on them. There is also scope for varying where old trees and dead wood are left. Leaving standing dead trees in the middle of a wood may cause fewer problems than leaving them on edges by rides. Trees left on the edge of a wood may be better for maintaining links with the rest of the countryside. More work is needed on these aspects. Therefore we have emphasized here simply the quantity of dead wood that is left, because this is a relatively easy thing for a manager to assess and to influence.

How important is your site?

The priority given to decaying wood habitats in a site such as the Bradfield Woods (important mainly for open space and young growth species) will be lower than in a site which has large numbers of veteran trees and is known to contain a rich deadwood fauna such as Windsor Forest and Great Park; it is more important to keep dead wood levels up where there is a long history of dead wood abundance than in one where it has accumulated only recently. However, how does a manager decide what level of significance to attach to dead wood in any particular site, particularly if there have been no surveys of dead wood species?

In Table 2 we have set down some of the factors that should be taken into account in judging the existing/potential interest of a site, based around:

- The known interest of the site for different species.
- The occurrence of decaying wood habitats and their continuity on the site.
- The origin and recent management of the woodland over the last 60 years.
- The nature of the surrounding landscape.

In some cases we have suggested more than one way of looking at the factor, so there are eight rows in total.

Sites do not have to score highly across the board to be important for dead wood and some factors may not be appropriate to a particular site. However on the whole the more ticks there are in the boxes to the right and higher up the table, the more valuable the site. Obviously the table cannot cover all eventualities and where this guidance suggests a wood might be valuable it is desirable to get more detailed ecological surveys carried out. However, even where there have been no special surveys the owner or manager can make some assessment of likely value from easily recorded features such as woodland size, landscape surrounding, presence of old trees.

Linking owner's objectives and nature conservation value

More attention should normally be given to the retention of decaying wood habitats in woods being managed for nature conservation than where the manager's prime objective is the production of high quality timber, although in the most important sites for dead wood its conservation should always be a priority.

Where the prime reason for managing woodland is nature conservation then the expected benchmark level should be set high. Where the interest in nature conservation is lower, for example in woods managed primarily for recreation or access, managers may choose to work towards slightly lower benchmarks because there are disadvantages in terms of safety issues or because people find dead wood unsightly. The guidance produced as part of the Veteran Tree Initiative may be helpful where there is a high nature conservation value and concerns about the safety of old trees (English Nature 2000).

The lowest benchmarks are likely to be set for woods where timber production is the prime objective because the more dead wood that is left in the wood the less is available for harvesting. However even the lowest benchmark is higher than most common practice in woods managed for timber production. Where the owner's objectives are a mixture then the right benchmark level may be intermediate.

Once the benchmark has been identified the manager can then explore what sorts of practices and systems in Table 1 are likely to produce the levels of dead wood habitat suggested.

A way forward?

As with any system of guidance, this approach, if applied mechanically, could lead to unnecessary uniformity in woodland. That is not our aim. We recognize that there maybe situations where it is much better to concentrate the efforts put into dead wood conservation in only part of an estate. We think however this approach is of value but would welcome comments on its appropriateness and applicability in different situations. Please send these to Keith Kirby (English Nature).

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